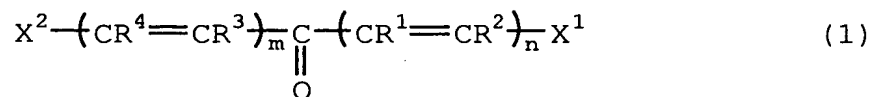


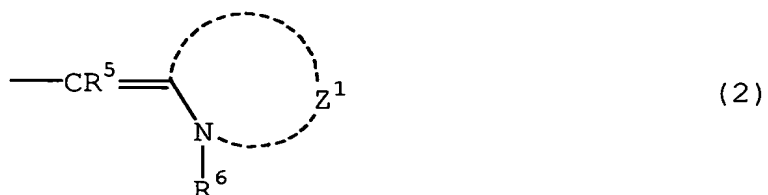
What is claimed is:

1. A two-photon absorbing polymerizable composition comprising at least a two-photon absorbing compound, a polymerization initiator and a polymerizable compound, said composition being photopolymerizable upon non-resonant two-photon absorption, wherein said two-photon absorbing compound is a methine dye.

2. The two-photon absorbing polymerizable composition as claimed in claim 1, wherein the methine dye is a cyanine dye, a merocyanine dye, an oxonol dye or a dye compound represented by the following formula (1):

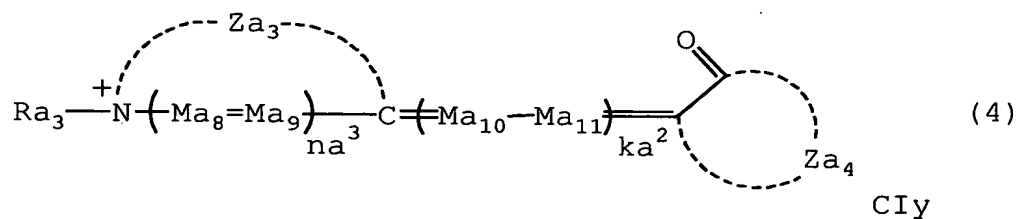
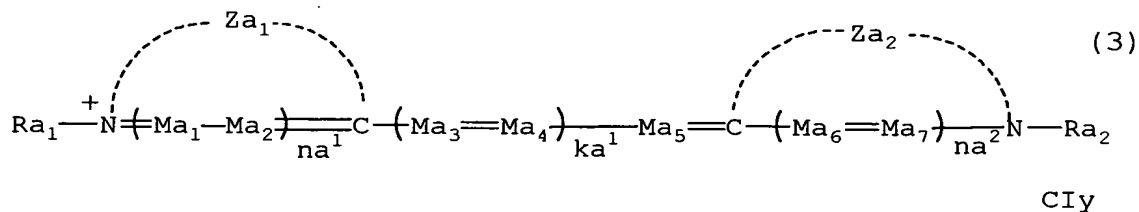


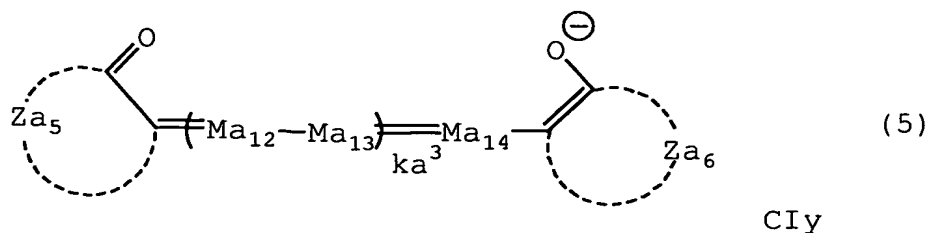
wherein  $R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$  each independently represents a hydrogen atom or a substituent and some of  $R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$  may combine with each other to form a ring;  $n$  and  $m$  each independently represents an integer of 0 to 4 and when  $n$  and  $m$  each is 2 or more, the plurality of  $R^1$ 's,  $R^2$ 's,  $R^3$ 's or  $R^4$ 's may be the same or different, provided that  $n$  and  $m$  are not 0 at the same time; and  $X^1$  and  $X^2$  each independently represents an aryl group, a heterocyclic group or a group represented by formula (2):



wherein  $R^5$  represents a hydrogen atom or a substituent,  $R^6$  represents a hydrogen atom, an alkyl group, an alkenyl group, an aryl group or a heterocyclic group, and  $Z^1$  represents an atomic group for forming a 5- or 6-membered ring.

3. The two-photon absorbing polymerizable composition as claimed in claim 2, wherein the methine dye is a compound represented by formula (1), a cyanine dye represented by the following formula (3), a merocyanine dye represented by formula (4) or an oxonol dye represented by formula (5):





wherein  $Za_1$ ,  $Za_2$  and  $Za_3$  each represents an atomic group for forming a 5- or 6-membered nitrogen-containing heterocyclic ring,  $Za_4$ ,  $Za_5$  and  $Za_6$  each represents an atomic group for forming a 5- or 6-membered ring,  $Ra_1$ ,  $Ra_2$  and  $Ra_3$  each independently represents a hydrogen atom, an alkyl group, an alkenyl group, an aryl group or a heterocyclic group,  $Ma_1$  to  $Ma_{14}$  each independently represents a methine group, which may have a substituent or may form a ring together with another methine group,  $na^1$ ,  $na^2$  and  $na^3$  each represents 0 or 1,  $ka^1$  and  $ka^3$  each represents an integer of 0 to 3, provided that when  $ka^1$  is 2 or more, multiple  $Ma_3$ s or  $Ma_4$ s may be the same or different and when  $ka^3$  is 2 or more, multiple  $Ma_{12}$ s or  $Ma_{13}$ s may be the same or different,  $ka^2$  represents an integer of 0 to 8, provided that when  $ka^2$  is 2 or more, multiple  $Ma_{10}$ s or  $Ma_{11}$ s may be the same or different, CI represents an ion for neutralizing the electric charge, and y represents a number necessary for the neutralization of electric charge.

4. The two-photon absorbing polymerizable composition as claimed in claim 2, wherein in the compound represented by formula (1),  $X^1$  and  $X^2$  each is a group

represented by formula (2).

5. The two-photon absorbing polymerizable composition as claimed in claim 3, wherein in the compound represented by formula (1),  $X^1$  and  $X^2$  each is a group represented by formula (2).

6. The two-photon absorbing polymerizable composition as claimed in claim 1, wherein the polymerization initiator is 1) a ketone-base polymerization initiator, 2) an organic peroxide-base polymerization initiator, 3) a bisimidazole-base polymerization initiator, 4) a trihalomethyl-substituted triazine-base polymerization initiator, 5) a diazonium salt-base polymerization initiator, 6) a diaryliodonium salt-base polymerization initiator, 7) a sulfonium salt-base polymerization initiator, 8) a triphenylalkylborate-base polymerization initiator, 9) a diaryliodonium organic boron complex-base polymerization initiator, 10) a sulfonium organic boron complex-base polymerization initiator, 11) a cationic two-photon absorbing compound organic boron complex-base polymerization initiator, 12) an anionic two-photon absorbing compound onium salt complex-base polymerization initiator, 13) a metal arene complex-base polymerization initiator or 14) a sulfonic acid ester-base polymerization initiator.

7. The two-photon absorbing polymerizable

composition as claimed in claim 1, wherein the polymerization initiator contains a polymerization initiator of generating at least one radical and the polymerizable compound contains a radical polymerizable compound of undergoing polymerization under the action of at least one radical.

8. The two-photon absorbing polymerizable composition as claimed in claim 1, wherein the polymerization initiator contains a polymerization initiator of generating an acid without generating at least one radical and the polymerizable compound contains a cationic polymerizable compound of undergoing polymerization under the action of at least one acid.

9. The two-photon absorbing polymerizable composition as claimed in claim 1, wherein the polymerization initiator contains a polymerization initiator of generating both at least one radical and at least one acid and the polymerizable compound contains either one or both of a radical polymerizable compound of undergoing polymerization under the action of at least one radical and a cationic polymerizable compound of undergoing polymerization under the action of at least one acid.

10. A two-photon absorbing polymerizable composition comprising at least a two-photon absorbing compound and a polymerizable compound, said composition

being photopolymerizable upon non-resonant two-photon absorption, wherein said two-photon absorbing compound is a methine dye.

11. The two-photon absorbing polymerizable composition as claimed in claim 10, wherein the two-photon absorbing compound is a cyanine dye represented by formula (3), a merocyanine dye represented by formula (4), an oxonol dye represented by formula (5), or a compound represented by formula (1) where  $X^1$  and  $X^2$  each is a group represented by formula (2).

12. A polymerization process comprising irradiating the two-photon absorbing polymerizable composition claimed in claim 1 with a laser ray at a wavelength being longer than the linear absorption band of the two-photon absorbing compound and not having linear absorption, and causing a polymerization reaction by using the two-photon absorption induced.

13. A polymerization process comprising irradiating the two-photon absorbing polymerizable composition claimed in claim 10 with a laser ray at a wavelength being longer than the linear absorption band of the two-photon absorbing compound and not having linear absorption, and causing a polymerization reaction by using the two-photon absorption induced.

14. A three-dimensional optical recording medium

comprising the two-photon absorbing polymerizable composition claimed in claim 1.

15. A three-dimensional optical recording medium comprising the two-photon absorbing polymerizable composition claimed in claim 10.

16. A stereolithography composition comprising the two-photon absorbing polymerizable composition claimed in claim 1.

17. A stereolithography composition comprising the two-photon absorbing polymerizable composition claimed in claim 10.

18. A two-photon absorbing polymerizable composition comprising at least two-photon absorbing compound, a polymerization initiator and a polymerizable compound, said composition being photopolymerizable upon non-resonant two-photon absorption, wherein the polymerization initiator is 1) an organic peroxide-base polymerization initiator, 2) a bisimidazole-base polymerization initiator, 3) a trihalomethyl-substituted triazine-base polymerization initiator, 4) a diazonium salt-base polymerization initiator, 5) a sulfonium salt-base polymerization initiator, 6) a borate-base polymerization initiator, 7) a diaryliodonium organic boron complex-base polymerization initiator, 8) a sulfonium organic boron complex-base polymerization initiator, 9) a cationic two-

photon absorbing compound organic boron complex-base polymerization initiator, 10) an anionic two-photon absorbing compound onium salt complex-base polymerization initiator, 11) a metal arene complex-base polymerization initiator or 12) a sulfonic acid ester-base polymerization initiator.